SOIL SURVEY OF THE OXFORD AREA, MICHIGAN.

By GROVE B. JONES and M. EARL CARR.

LOCATION AND BOUNDARIES OF THE AREA.

The Oxford area is situated in the southeastern part of lower Michigan and comprises the six northeastern townships of Oakland County. It embraces an area of 134,144 acres or about 210 square miles, and constitutes a northward extension of the soil survey made

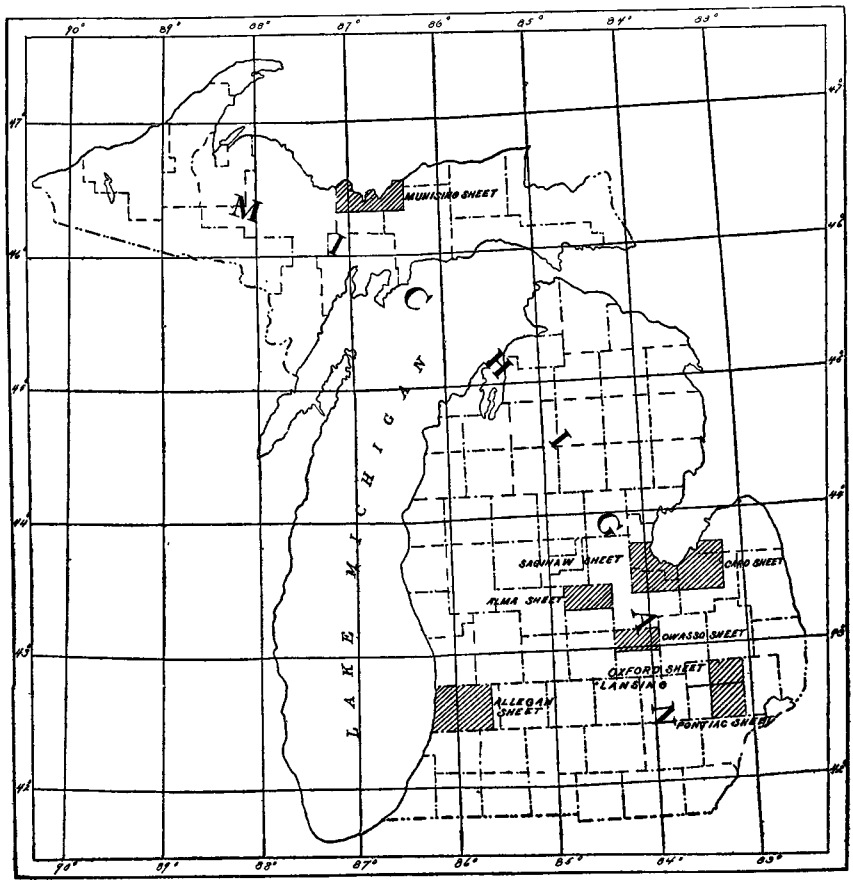

FIG. 31.—Sketch map showing location of the Oxford area, Michigan.

in Oakland County in 1903, which covered the nine southeastern townships of the county.[a] The area is bounded on the north by Lapeer County and on the east by Macomb County.

[a] Soil Survey of the Pontiac area, Michigan. Field Operations of the Bureau of Soils, 1903.

HISTORY OF SETTLEMENT AND AGRICULTURAL DEVELOPMENT.

Until about 1815 all of this part of Michigan was an unbroken wilderness occupied only by Indians. In the next few succeeding years scattered settlements were made throughout the region, and in 1819 a county government was organized, the first in the interior of the State. The population at this time was small and scattered. The Indians still occupied much of the country, but were not troublesome, and gradually disappeared before the advancing tide of civilization.

A large proportion of the pioneer settlers of the county, as well as of the State, came from New York, as is evidenced by the names of many of the towns and villages, the settlers giving them the names of their former home towns. Other settlers came from the New England States, New Jersey, and Pennsylvania, and a few direct from European countries.

The county was surveyed and plotted on the section plan, each section being 1 mile square. The land was sold by the Federal Government at a low price, thus inducing immigration to this section, notwithstanding the fact that it took about thirty days to make the journey from New England and New York.

The increase in population for a time was not especially rapid, but was steady. In 1825 the population of the county was 1,362, but during the next decade it reached 7,390, and for thirty-five years thereafter the rate of increase was more than 1,000 a year. According to the census of 1900, the population of the county was 44,792, which, however, when compared with that of 1870, shows an increase of only 3,925. The slight increase in the last three decades is explained by the fact that during a portion of that time there was an exodus to the newer States of the West and Northwest.

The early settlers found nearly all of the land covered with a dense forest, and as the timber at that time had no commercial value it entailed a vast amount of labor without any immediate remuneration to clear and prepare the land for cultivation.

The first crops grown were almost, if not entirely, for home use, but with the increasing acreage of wheat and corn the production soon exceeded home demands and the surplus was transported by water and marketed in the East.

The acreage of wheat exceeded that of all other crops for a long time, but for many years it has been growing less and less as the adaptability of the sandy soils to other crops has been recognized. At present the principal crops of the county are potatoes, beans, corn, hay, and fruits.

In some localities stock raising has gained considerable prominence, and it is in these communities that the best farms of the county are to be seen.

CLIMATE.

The following climatological data, compiled from the records of the Weather Bureau stations located at Birmingham and Flint, show the normal monthly and annual temperature and precipitation for this section. Birmingham is 11 miles south of the southern boundary of the area, while Flint is 19 miles north of the northern line:

Normal monthly and annual temperature and precipitation.

Month.	Birmingham		Flint.		Month.	Birmingham.		Flint.	
	Temperature.	Precipitation.	Temperature.	Precipitation.		Temperature.	Precipitation.	Temperature.	Precipitation.
	°F.	In.	°F.	In.		°F.	In.	°F.	In.
January	23.0	1.75	22.2	1.54	August	68.2	2.38	67.4	2.65
February	22.7	1.97	20.9	1.50	September	61.4	2.53	61.2	2.69
March	31.7	2.13	30.6	1.71	October	50.0	2.43	49.1	1.97
April	46.3	2.51	45.2	2.31	November	36.9	2.82	35.8	2.55
May	59.5	3.22	56.2	3.67	December	26.5	1.82	26.6	1.76
June	68.2	3.23	65.9	3.03	Year	47.2	29.59	46.0	28.22
July	72.0	2.80	70.1	2.84					

The following table shows the dates of the first and last killing frosts as recorded at the same Weather Bureau stations:

Dates of first and last killing frosts.

Year.	Birmingham.		Flint.	
	Last in spring.	First in fall.	Last in spring.	First in fall.
1901	Apr. 22	Oct. 4	Apr. 21	Oct. 4
1902	May 11	Oct. 8	May 15	Oct. 10
1903	May 4	Oct. 23	May 4	Sept. 29
1904	May 11	Oct. 7	May 11	Sept. 21
Average	May 5	Oct. 12	May 6	Oct. 1

PHYSIOGRAPHY AND GEOLOGY.

The topography of the area surveyed is rolling to hilly, with comparatively little level country. It is considerably more rolling and hilly than the Pontiac area and is the roughest section of the county. Its elevation is slightly higher than the Pontiac area, and it lies on the crest of a watershed which extends southwestward across the State from the point of "the thumb" at Port Austin and separates the Saginaw Basin from the Lake St. Clair Basin. The greater part of the area lies to the southeast of this watershed and its drainage is accomplished by small streams flowing southeasterly into Lake St. Clair and the Detroit River. Only a small proportion of the area, in the northern and northwestern parts, is drained by streams of the Saginaw Basin.

As a result of the rough topography the heavy soils found in the Pontiac area occur here to a much less extent, the sand and sandy-loam types predominating. The most level section of the area occurs in a more or less broken body extending westward from about 2½ miles east of Oxford to the western boundary of Oxford Township, and thence southwest to the southern boundary of the area. Although there is very little level land, practically all of the rolling, hilly country can be cultivated. The surface of the whole area is typical of a glaciated region. This is especially noticeable in the numerous lakes, which vary in size from a few square rods to nearly a square mile. The largest lakes are Lakeville, Orion, Long, Whipple, Voorheis, and Deers. Lakes are most numerous in the more level section above mentioned and form one of the most prominent physiographic features of the area. Large and small basinlike depressions of muck and "tamarack swamps" are also of frequent occurrence, marking an advanced stage of the more shallow glacial lakes.

The surface of the whole county is covered by a mantle of glacial drift, burying the native rocks so deep that they do not enter into or influence the soil formations. This drift occurs both as a land and water deposit. Numerous land moraines occur, which were deposited during some temporary halt of the ice front in its recession northward at the close of the glacial period. Other parts of the area seem to have been formed by shallow water deposits or swift currents emerging from the ice sheet. Frequently sections of both the level and rolling lands show stratified and cross-bedded sands and gravels, indicating currents of water of varying velocities not flowing for any great length of time in the same direction during deposition. Again, other sections show a disorderly mass of drift without any arrangement whatever. Almost always the surface to a depth of 3 to 5 or more feet consists of unsorted drift, even where it overlies the stratified material. Large bowlders of granite and other crystalline and metamorphic rocks occur on the surface in some portions of the area. Most of the bowlders, however, are of moderate size and are generously distributed over the entire area.

SOILS.

Ten different soil types, including Muck and Meadow, were mapped in this area. These several types do not occur in extensive areas, but are found in small isolated bodies, the light and heavy soils being closely associated without any uniformity as to occurrence. Bodies of Muck occur in all the different types.

The extent of each of the soil types mapped is shown in the following table:

Areas of different soils.

Soil.	Acres.	Per cent.	Soil.	Acres.	Per cent.
Miami fine sandy loam	44,224	32.9	Meadow	4,992	3.7
Miami sandy loam	35,584	26.5	Miami gravelly sand	3,968	3.0
Muck	15,424	11.5	Clyde fine sandy loam	1,600	1.2
Miami clay loam	12,160	9.1	Miami black clay loam	1,216	.9
Miami gravelly sandy loam	9,472	7.1	Total	134,144	
Miami sand	5,504	4.1			

MIAMI GRAVELLY SANDY LOAM.[a]

The soil of Miami gravelly sandy loam to a depth of 12 inches is a brown sandy gravelly loam. The coarser grades of gravel predominate, the gravel representing from 25 to 70 per cent of the soil mass. The subsoil is a brown medium to coarse sandy loam containing varying quantities of gravel. Sometimes the subsoil is a loose gravel bed, the layer of sandy loam being entirely lacking.

The surface in some sections is covered with well-rounded stones and pebbles up to 8 inches in diameter. While the surface is often uneven and stony, there is but a small percentage of this soil that can not be cultivated. The rougher part of this type lies in the southeastern corners of the area. In the latter place a very desirable quality of gravel is secured for railroad ballast, while any of the smaller knolls scattered throughout this type afford good material for road use.

With the exception of the area in the northern part of Independence township, embraced mainly within sections 3 and 4, the Miami gravelly sandy loam occupies some of the roughest and most hilly parts of the area surveyed. Isolated areas occur as knolls and ridges among other types, and usually contain a higher percentage of coarse gravel than the less rolling areas of the type. The level area in Independence Township, above referred to, is thickly strewn with the coarser grades of gravel and pebbles. The larger pebbles and bowlders have been removed from the surface of much of this type of soil and are either used in making fences or are piled in the fields.

The Miami gravelly sandy loam is a glacial soil, part of which is morainic in origin. Its physiographic position and structure render it a naturally well-drained soil. The area immediately north of Oxford is only moderately rolling, and upon it general farming is practiced. In favorable seasons good crops are produced. Corn

[a] In the adjoining area of Pontiac this type was called Allegan gravelly loam.

yields about 50 bushels, potatoes from 125 to 200 bushels, hay about 1½ tons, and rutabagas from 400 to 700 bushels per acre. The Miami gravelly sandy loam is a desirable soil for peaches, apples, grapes, small fruits, and vegetables.

The following table gives the average results of mechanical analyses of the fine earth of this soil type:

Mechanical analyses of Miami gravelly sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
14259, 14261	Soil	6.1	16.7	12.2	28.4	11.8	16.4	7.8
14260, 14262	Subsoil	4.6	19.1	12.6	24.1	9.1	11.3	18.9

MIAMI SAND.

The Miami sand is a light to dark brown medium to fine sand from 6 to 15 inches deep, underlain by a yellow or reddish-brown medium to fine sand to a depth of 3 feet or more. Small areas of fine gravel frequently occur in this type of soil, but areas of coarse gravel with occasional bowlders are not often found. With the exception of small knolls, the soil generally contains sufficient organic matter to give it a loamy texture. The degree of loaminess is greatly influenced by the cultural methods employed.

The Miami sand occurs both as small level areas and as isolated knolls. For the most part it is well drained, the exceptions being the margins where it borders bodies of Muck. In such cases the top soil is a dark-brown or black sand, while the subsoil is usually a light-gray color.

About the same crops are grown upon the Miami sand as upon the heavier soils of the area, but the yields are usually light. Some few fields, however, were noticed where, by the introduction of better cultural methods, the productiveness of the soil had been greatly increased, in one instance being five times as great as that of an adjoining neglected field.

The Miami sand readily responds to fertilizers, and by careful management can be made a productive, profitable, and lasting soil. It is well adapted to vegetables and fruits and any crop requiring a light sandy soil. Potatoes do especially well in wet seasons, but when the rainfall is below the average they are apt to suffer from drought.

Field peas sown in June and cut before maturity, but after they are well podded, produce excellent roughage and greatly increase the productiveness of the soil. Twelve quarts of corn added to one bushel of field peas, which is sufficient to sow one acre, also makes a good crop for feed.

The following table gives the average results of mechanical analyses of the fine earth of this soil type:

Mechanical analyses of Miami sand.

Number.	Description	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13375, 14257	Soil	0.3	4.4	9.6	53.6	19.3	8.1	4.4
13376, 14258	Subsoil	.2	2.9	8.2	57.6	21.3	6.3	3.1

MUCK.

The Muck areas of this survey consist of accumulations of organic matter of different degrees of decomposition. The less decomposed material more nearly resembles Peat, but it was impossible to separate this material from the true Muck. This accumulation of vegetable remains is underlain by clay, sand, and marl, and upon the character of the subsoil depends the value of these Muck areas. Muck underlain by clay is considered a valuable soil, if so situated that it can be artificially drained. Abundant yields of hay, corn, and vegetables are produced. Where the subsoil is a sand and the Muck covering is less than 2 feet deep it is practically worthless, except for grazing purposes. When dry this Muck or Peat will burn readily, and when the vegetable matter is thus removed the underlying sand is unfit for agricultural purposes.

The largest areas of Muck occur mostly in the western half of the survey, but isolated patches and areas, in which small streams have their source, occur in nearly all parts of the survey. The natural growth consists of water-loving grasses and tamarack, while upon the more shallow clay subsoil areas oak, elm, and other hardwoods occur.

A few small areas of Muck are being cultivated, while others have been cleared or burned over and sufficiently drained to be used for pasturage. Corn, onions, carrots, potatoes, and celery produce abundantly. For the growing of onions the Muck is plowed in the fall about 8 inches deep, and from April 20 to May 10 the onions are planted. The average yield is about 700 bushels per acre. Sugar beets grow luxuriantly, but have a high content of impurities.

The Muck is best adapted to celery. Many of the areas could be drained at a moderate cost, and considering the abundant yields to be had from the growing of special crops it is surprising that more of such areas are not drained and put in a cultivable condition.

MEADOW.

The term Meadow, as used in the Oxford area, includes the low-lying wet land adjacent to streams and a few isolated swampy areas in the upland. The soil is of a variable character, ranging from clay

loam to gravel. The areas are not suitable for cultivation, but usually support sufficient grass for pasturage. The timber growth consists of oak, elm, hickory, and other hardwoods. The largest area of Meadow is about 5 miles east of Clarkston, midway between Orion and Independence townships. This area supports a heavy timber growth.

MIAMI BLACK CLAY LOAM.

The soil of the Miami black clay loam, to a depth from 8 to 15 inches, is a black or drab-colored clay loam. The subsoil is a drab-colored clay, more compact and tenacious than the soil. Its naturally wet condition renders this soil practically unsuited for cultivation without artificial drainage. The soil is heavy and plastic, and if worked when too wet forms clods and bakes. Near the boundaries between the Miami black clay loam areas and the areas of sandy soils there is usually a thin veneer of sand, which, when mingled with the clay loam, renders the soil more friable, easier to work, and less liable to crack and bake.

As it occurs in this area the Miami black clay loam is of little importance. It embraces but few square miles, is usually not yet sufficiently drained for cultivation, and is devoted principally to grass.

The largest body of the Miami black clay loam occurs in Oxford Township, and embraces parts of sections 17, 18, and 19. Large ditches have been dug through this area, but at present only the higher and better-drained portions are cultivated. A few small areas are scattered through the northern part of the survey, while patches too small to map frequently occur as depressions in the Miami clay loam type.

The level surface and wet condition of this soil account for its texture and color. Where drained and cultivated corn is the principal crop grown and yields as high as 75 bushels per acre, the average being about 50 bushels. For hay the average yield is 2 tons per acre.

The following table gives the results of mechanical analyses of samples of this soil type:

Mechanical analyses of Miami black clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
14273	Soil	0.4	2.4	2.3	11.9	10.0	47.8	24.8
14274	Subsoil	.4	1.2	1.7	9.3	11.5	49.2	26.4

MIAMI GRAVELLY SAND.[a]

The soil of the Miami gravelly sand consists of a brown gravelly sand from 8 to 12 inches deep. There is present in varying amounts fine gravel and coarse sand, with sometimes enough fine material to render the surface loamy. Occasionally the underlying gravel outcrops upon the surface. The subsoil is a coarse yellow sand, containing fine gravel in slightly greater quantities than the soil.

The Miami gravelly sand occupies high ridges and knolls, which fact, together with its loose porous structure, renders it very susceptible to drought. The largest single area of the type occurs east of Ortonville, where it occupies a series of well-rounded knolls, presenting a rough, billowy topography. In this particular area the Miami gravelly sand is closely associated with the Miami sand. Frequently the side of one hill will be typical Miami sand, while on the opposite side the Miami gravelly sand will be typically developed. Pockets of pure sand also occur.

On account of its physiographic position and its susceptibility to drought, but few attempts have been made to cultivate this soil, and then only upon the moderately rolling areas.

The more loamy phases produce sufficient grass for pasturage, and sheep do well on such areas. Only fairly good crops are produced under favorable conditions upon the best phases of the type. Corn yields from 10 to 25 bushels, beans from 8 to 15 bushels, and rye from 10 to 20 bushels per acre.

Upon the rough, ridgy areas, which are nothing more than gravel beds, there is only a scanty growth of grass and weeds, mullein being the principal vegetation.

The following table gives the average results of mechanical analyses of fine-earth samples of this soil type:

Mechanical analyses of Miami gravelly sand.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13381, 14253	Soil	10.3	27.8	16.2	17.6	6.2	12.1	9.6
13382, 14254	Subsoil	12.2	36.1	16.8	17.1	4.6	7.5	5.5

The following samples contained more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 13382, 0.7 per cent; No. 14254, 8.5 per cent.

MIAMI FINE SANDY LOAM.[b]

The Miami fine sandy loam is the most important soil type in the area. It is the greatest in extent and ranks first in agricultural value. The soil is a brown sandy loam from 10 to 24 inches deep, underlain

[a] This is the soil mapped in the adjoining area of Pontiac as Marshall gravel.

[b] This type of soil was mapped in the adjoining area of Pontiac as the Oakland sandy loam.

by a loam, clay loam, or clay. The soil of the Miami fine sandy loam closely resembles that of the Miami sandy loam, the main difference between the two types being the heavy subsoil of the former. Where the surface is rolling and erosion has taken place knolls of stiff clay are prominent features.

This type occurs in two phases, differing slightly in texture and depth. Neither phase occurs by itself in any extensive area, nor is one phase confined to any single locality, both phases always occurring closely associated in different parts of the survey. In one phase the brown sandy loam is composed of medium sand, underlain by a loam or clay. The soil has an average depth of 18 inches and is quite uniform in texture. The other phase has a heavier soil, consisting of a fine sandy loam somewhat darker in color. The subsoil is a heavy brown or yellow clay resembling the stiff subsoil of the Miami clay loam. Clay knolls are more prominent in this phase than in the other, while in the depressions the top soil closely resembles that of the Miami clay loam.

Gravelly areas, from 1 to 5 acres in extent, occur scattered through the type. The larger stones have been piled or used in making fences. The type is generally rolling and thoroughly well drained. It occurs in areas of varying size throughout the survey, the largest body being located northeast of Oxford.

Upon the Miami fine sandy loam general farming is practiced, and on account of physical properties and position it is considered the most desirable soil of the area for this purpose. There is but a slight difference in crop yields between the two phases of this soil, except in the driest seasons. Where the sandy soil attains a depth of over 2 feet, which is the exception rather than the rule, there is a slightly reduced crop yield. The stiff clay subsoil usually retains sufficient moisture to withstand periods of drought.

Corn yields from 30 to 75 bushels, barley from 20 to 30 bushels, and beans from 15 to 25 bushels per acre. Clover and timothy grow well, producing from 1½ to 2 tons of hay per acre. Clover is also grown for seed. Peaches, apples, small fruits, and truck crops do especially well.

The following table shows the average results of mechanical analyses of samples of this soil type:

Mechanical analyses of Miami fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13379,14275	Soil	1.8	7.1	9.4	29.9	15.6	24.6	11.1
13380,14276	Subsoil	2.0	7.1	7.9	25.5	14.1	24.9	18.3

The following sample contained more than one-half of 1 per cent of calcium carbonate ($CaCO_3$): No. 13380, 11.1 per cent.

CLYDE FINE SANDY LOAM.

The Clyde fine sandy loam is a dark-brown loam or heavy fine sandy loam from 8 to 15 inches deep resting upon a subsoil consisting either of a sandy loam, usually yellow in color, or a heavy dark-colored loam. Where the soil occupies low, wet positions there is a covering of black humus from 1 to 4 inches deep. Here the subsoil is usually a light-gray heterogeneous mixture of silt, sand, and medium-sized gravel.

The Clyde fine sandy loam has a nearly level surface, being broken only by low knolls and slight depressions. The natural drainage is poor, and for the most part artificial drainage is necessary before good crops can be secured.

The type occurs typically developed in Oakland Township, in sections 2 and 3, and also in the vicinity of Leonard. These are the largest areas. The type is of very limited extent, covering in all but 1,600 acres, and from an agricultural standpoint is of little importance. Not much of it is cultivated, and the yields are only fair. The Clyde fine sandy loam is used almost exclusively for wood lots and pasturage. Hay produces from 1 to 2 tons per acre. The timber growth consists of elm, oak, and hickory.

The following table shows the results of mechanical analyses of the fine earth of this soil:

Mechanical analyses of Clyde fine sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
14269	Soil	1.5	5.2	8.1	36.1	19.2	20.9	8.7
14270	Subsoil	1.3	5.3	7.6	28.5	24.0	21.3	11.7

MIAMI SANDY LOAM.

The Miami sandy loam is a light to dark-brown medium to fine sandy loam from 10 to 15 inches deep, underlain by a yellow sand or sandy loam of about the same texture. There is nearly always present in both soil and subsoil gravel in varying amounts and sizes, while on the surface there is a generous sprinkling of the same material, and large pebbles and small bowlders are not infrequently met with.

The Miami sandy loam, in extent and agricultural importance, ranks second among the soils of the area surveyed. The largest areas of this type occur in the central and southern parts of the survey. In the vicinity of Oxford it has a level surface, but the topography changes to gently rolling farther south and west. Some of the smaller areas have a somewhat rough, broken surface, with an occasional clay or gravel hill rising above the general level of the type.

The level area near Oxford possesses a slightly heavier subsoil than the typical soil and consists of a light-brown sandy loam containing sufficient clay to make it sticky when wet. It also contains a higher percentage of fine gravel.

This soil on account of its open character is thoroughly drained and can usually be worked two weeks earlier than the heavier soils. At the same time the subsoil, as a rule, is sufficiently compact and retentive of moisture to prevent any serious damage to crops during an ordinary period of drought.

All the crops of the area are grown upon the Miami sandy loam. Corn yields from 25 to 40 bushels, rye from 15 to 30 bushels, oats from 35 to 70 bushels, buckwheat from 15 to 20 bushels, beans from 10 to 20 bushels, hay from 1 to 2 tons, and rutabagas from 400 to 700 bushels per acre. The growing of alfalfa has been attempted with varying degrees of success.

The Miami sandy loam is a strong potato soil, and during wet seasons the yields are better than on the heavier soils. The potatoes grown upon the sandy soils are not so susceptible to blight and rot. Small fruits and vegetables are grown to some extent, and these could be made profitable if more extensively cultivated. Apple orchards in the more rolling sections have proved quite successful.

The following table gives the average results of mechanical analyses of typical samples of the soil and subsoil of the Miami sandy loam:

Mechanical analyses of Miami sandy loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13373, 14263, 14265	Soil	2.6	16.7	13.1	35.1	9.3	12.7	6.7
13374, 14264, 14266	Subsoil	2.2	11.7	15.3	47.8	10.3	7.7	4.6

MIAMI CLAY LOAM.

The soil of the Miami clay loam, to a depth of from 8 to 12 inches, is a heavy brown or drab-colored loam or clay loam. The subsoil is a heavy clay loam or stiff clay with a depth of 3 feet or more. Only a small quantity of gravel is present, but the surface was originally strewn with various-sized bowlders. These for the most part have been removed from the cultivated fields and utilized mostly in making fences or as foundations for buildings.

The Miami clay loam generally occurs in small bodies as knolls and depressions, and is usually associated with the Miami fine sandy loam. The largest and most important area occurs in the southeastern corner of the survey, where the type occupies the rolling upland interspersed with steep knolls and ridges. On some of the steeper slopes and knolls the soil has been entirely removed by erosion, and

the stiff clay subsoil is exposed. These clay knolls, which occur not only in areas of the Miami clay loam, but are also found in the Miami fine sandy loam and Miami sandy loam types, are troublesome to the farmer. If plowed when either too dry or too wet the soil forms clods which are difficult to pulverize. These stiff clay patches are often left uncultivated, as the crop returns would not pay for the labor of cultivating them. For the most part the natural drainage of this type is very good; only a few of the smaller areas, occurring as depressions, would be much benefited by artificial drainage

All the general farm crops of the area are grown on the Miami clay loam. It is an ideal corn and grass soil, and is well adapted to dairying and stock raising. Corn yields from 40 to 60 bushels, oats from 40 to 60 bushels, wheat from 15 to 25 bushels, rye from 15 to 25 bushels, and hay from 1 to 3 tons per acre. The Miami clay loam supports a heavy growth of hickory, maple, beech, oak, and other varieties of hardwoods. It is the heaviest and strongest soil of the area.

The following table shows the average results of mechanical analyses of typical samples of the Miami clay loam:

Mechanical analyses of Miami clay loam.

Number.	Description.	Fine gravel.	Coarse sand.	Medium sand.	Fine sand.	Very fine sand.	Silt.	Clay.
		Per cent.	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*	*Per cent.*
13377, 14271	Soil	1.7	4.1	4.7	16.4	14.2	38.4	20.1
13378, 14272	Subsoil	.3	1.2	1.4	6.0	9.7	46.9	34.1

AGRICULTURAL CONDITIONS.

The area surveyed, taken as a whole, is no excepton to the general prosperity noticeable throughout Oakland County. The farm buildings, as a rule, are neat and commodious. The barns are modern and well constructed, often costing more than the dwelling. The cost for constructing the average size gambrel-roof barn, as seen in this area, ranges from $1,000 to $3,000.

Occasional springs are seen, and in the western part of the area artesian wells are not uncommon, and are numerous in the vicinity of Ortonville. Nearly every farmer has a windmill and a covered tank to supply water for domestic use.

Stones and bowlders are common over the entire area, and, as elsewhere stated, are gathered from the fields and utilized for making fences and as foundations for buildings. The stone fence consists of medium-sized stones piled one upon another, with a shingle between, to a height of 2 or 3 feet, and above this there are usually strung 2 barb wires, thus making a very substantial and durable

fence. A few rail fences are still seen, but these are fast giving place to wire fences.

Upon the Miami gravelly sand and the rough Miami gravelly sandy loam areas the signs of prosperity seen elsewhere are generally lacking, and not until some special crops are introduced will conditions be bettered in these localities.

The fact that the greater number of the farmers own their farms and operate them personally accounts in part for the prosperous condition of this area. Few tenants take the same interest in a farm and as good care of the buildings as does the owner, and in time the results of neglect become noticeable. A few retired farmers have moved to town, and rent their farms.

The census of 1900 shows that 66.5 per cent of the farms of Oakland County are operated by the owners. Leasing of land is conducted both on a cash and share basis. The cash rent is usually from $2 to $2.50 an acre. Under the share system the owner furnishes one-half of the seed and stock and receives one-half of the crops and increase. According to the census of 1900 the average size farm contains 110.2 acres. Labor can usually be secured for $25 a month, with board in addition, but for the greater part of the year the farmer does his own work. Improved machinery, such as potato diggers, corn cutters, bean harvesters, and hay loaders, has to a certain extent simplified the labor question.

The principal agricultural products of the area are corn, oats, rye, potatoes, and beans. Corn is not grown for the market, but is fed on the farm. Potatoes are extensively grown and usually command a good price. Large shipments are made each year, and they may be said to be the money crop of the area. Sometimes the blight decreases the usually large yields, but it does not make its appearance regularly each season. The sandy soils are well adapted to this crop, as high as 300 bushels per acre being secured. Rutabagas are also quite generally grown, with yields varying from 400 to 800 bushels per acre. Beans produce well and are usually grown upon the sandy soils. At Oxford a mill is operated where the beans are cleaned, sorted, and polished for the market. Other crops of lesser importance are buckwheat, onions, carrots, turnips, and cabbage. These all find a ready market, and trucking on a large scale would prove a remunerative business.

Both the Miami black clay loam and Miami fine sandy loam would doubtless prove good sugar-beet soils, but at present none are grown. Peaches and apples are the most important fruit crops of the area. The sandy and gravelly soils produce a good quality of fruit. With careful cultural methods along scientific lines the growing of both apples and peaches should be highly profitable. Grapes, plums, cherries, and pears do well, but are not grown extensively.

General farming, regardless of the adaptability of certain soils to certain crops, has until recently been the rule. The good results obtained by specialized farming are, however, fast being recognized. Wheat at one time was generally grown on all the soils, but for the last few years the acreage of this crop has been gradually growing less. This change has been brought about by the decreasing yields due to continued cropping and to the damage done by the Hessian fly.

Dairying is carried on to some extent. Excepting that used for local consumption, the milk is made into butter and shipped to Detroit. Homemade butter is always in demand, and an agreement to furnish a certain quantity each week to customers is often made. Some sheep are raised and are found to be quite profitable. Dairying and stock raising could be profitably extended.

The silo, very little used in the area at present, could be used to great advantage. Late corn or corn sown with this purpose in view, when cut green and stored in silos, furnishes an excellent feed for both dairy and market cattle.

Alfalfa has been tried to a limited extent. At Orion a small field that was doing well was seen on the Miami sandy loam. It had been cut three times during the season, and in October was furnishing excellent pasturage. Alfalfa is difficult to start, and in attempting to grow it many farmers become discouraged. In getting a stand the weeds are inclined to crowd the alfalfa out, and frequent cuttings are necessary to keep the weeds back. No attempt should be made to gather the first cutting or the one made while the plant is in bloom. If left on the ground the soil is greatly enriched and the plants strengthened. A few acres in alfalfa were also noted at Oxford, and the crop was doing well. The introduction of this crop into the rotation would prove of great value to this section, as it is valuable both as a forage crop and as a soil renovater.

The area is well supplied with transportation facilities. The Michigan Central Railroad, running from Detroit to Mackinaw, passes through the central part of the area from north to south. The Pontiac, Oxford and Northern Railroad passes through the south central and northeastern part of the area. Besides the steam railroads the Flint Division of the Detroit United Electric Railway connects the area direct with Detroit and Flint. This line carries large quantities of all farm products. Much of the produce, including poultry, is shipped from Oxford, the largest town of the area. Orion, Clarkston, Leonard, and Ortonville are local markets of less importance.

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SOIL MAP
MICHIGAN
OXFORD SHEET

U.S. DEPT. OF AGRICULTURE
BUREAU OF SOILS
MILTON WHITNEY, CHIEF

MICHIGAN GEOLOGICAL SURVEY
ALFRED C. LANE, STATE GEOLOGIST
MICHIGAN AGRICULTURAL EXPERIMENT STATION
C. D. SMITH, DIRECTOR

SOIL PROFILE
(3 feet deep)

Miami gravelly sandy loam — Ssc / Ssc
Miami gravelly sand — S / S
Miami sand — S / S
Miami sandy loam — Ssc / Ssc
Miami fine sandy loam — Ssc / Sc
Miami clay loam — Sc / Hscc
Miami black clay loam — Scc / C
Clyde fine sandy loam — Sc / Ssc

LEGEND
Ssc Sandy loam
S Sand
Sc Loam
Hscc Heavy clay loam
Scc Clay loam
C Clay

LEGEND
Ml — Miami gravelly sandy loam
Mg — Miami gravelly sand
Ms — Miami sand
Msl — Miami sandy loam
Mf — Miami fine sandy loam
Mc — Miami clay loam
Mb — Miami black clay loam
Cs — Clyde fine sandy loam
Me — Meadow
M — Muck

R. 9 E. | R. 10 E. | R. 11 E.
T. 5 N. | T. 4 N.
LAPEER CO. | OAKLAND CO. | MACOMB CO.
BOUNDARY LINE

BRANDON | OXFORD | ADDISON
INDEPENDENCE | ORION | OAKLAND

Ortonville | Oakwood | Thomas | Leonard | Lakeville | Oxford | Orion | Clarkston | Eames | Goodison

Bald Eagle Lake | Seymour Lake | Whipple Lake | Walters Lake | Deers Lake | Voorheis Lake | Stony Lake | Long Lake | Lakeville Lake

Michigan Pontiac & Northern R.R. | Grand Trunk Western R.R. | Pontiac, Oxford & Northern R.R.

Soils Surveyed by
Grove B. Jones and M. Earl Carr
1905.

Scale 1 inch = 1 mile

Field Operations
Bureau of Soils
1905